TA-1120

FOR THE SETS WITH SERIAL NUMBER FROM 1001 TO 4000

Specifications (1)

System : All Silicon Transistor integrated stereo amplifier

Circuit : Quasi-complementary symmetry circuit, 46 transistors, 23 diodes

Transistor : 2SC401 (27), 2SC293 (3), 2SC297 (1), 2SC299 (5), 2SD45 (8), 2SA-527 (2)

Diode : DS2M (4), FR-1U (4), IT206 (10), SV6 (4), 2SF-103 (1, SCR)

Power requirement : 100, 117, 220 or 240V AC 50/60 Hz

Power consumption : Approx. 30W at zero signal

Approx. 200W at rated output

Dimensions : 400W×145H×310 mm D (15¾×5¾×12¼") (including knobs)

Weight : Approx. 11 kgs. (24 lbs.)

SONY®
SERVICING GUIDE

Specifications (2)

Amplifier section

Power output : Non-clip music power : 160 W both channels (8 ohms)
Music power (IHFM) : 120 W both channels (8 ohms) ±0.5 db
Rated output (IHFM) : 50 W per channel (8 ohms) ±0.5 db
35 W per channel (16 ohms) ±0.5 db

Harmonic distortion : (IHFM)
At 1 KHz : Less than 0.1% at rated output
Less than 0.07% at 25 W output
Less than 0.05% at 0.5 W output
At 20 Hz~80 KHz : Less than 0.5% at rated output

Intermodulation distortion : (SMPTE) Less than 0.3% at rated output, 70 Hz : 7 KHz=4 : 1

Frequency response : 10 Hz~100 KHz $^{+0}_{-1}$ db at rated output

S/N ratio : Closed circuit (IHFM) 110 db
*through weighted network as per ASA Z24,3-1944 (40 db-A)

Input impedance : 100 k ohms or more

Damping factor : More than 70 at 1 KHz

Sensitivity : 1 V at 50 W output

Preamplifier section

Output voltage : Preamp out : 1.5 V, Rec out : 0.2 V

Harmonic distortion : At 1.5 V output : Less than 0.1% at 1 KHz
Less than 0.1% at 30 Hz
Less than 0.2% at 15 KHz

Frequency response : Tuner input, Aux input (flat frequency response)
30 Hz~100 KHz $^{+0}_{-2}$ db (twin-T low-cut filter below 30 Hz)
Phono-1, Phono-2 (zero-reference frequency)
30 Hz~15,000 Hz±0.5 db (RIAA eq. curve)
Tape head (zero-reference frequency)
30 Hz~15,000 Hz±0.5 db (NAB eq. curve)
(adjustable±3 db at 10 KHz)
Mic input (flat frequency response)
30 Hz~50,000 Hz $^{+0}_{-2}$ db

Input sensitivity :

Tuner, Aux	0.2V (adjustable),	Impedance : more than	100 k ohms
Phono-1	5 mV,	〃	47 k ohms
Phono-2	1 mV,	〃	47 k ohms
Tape head	1 mV, (suitable for 4.5 k ohm playback head)	〃	500 k ohms
Mic	2 mV,	〃	500 k ohms

Inputs : Mic, Tape head, Phono-1, Phono-2, Tuner, Aux, Tape, Rower Amp in

Outputs : Rec out (0.2V), Preamp out

Integrated record/playback connector : Input sensitivity : 0.5 V
Output level : 25 mV

Tone controls : Bass 100 Hz±10 db 2 db/step
Treble 10k Hz±10 db 2 db/step

Filters : High filter 12 db/oct above 9 KHz
Low filter 12 db/oct below 50 KHz

S/N ratio : (IHFM)

Aux, Tuner	(closed circuit)	more than	90 db
Phono-1	(〃)	〃	80 db
Phono-2	(〃)	〃	70 db
Tape head	(〃)	〃	70 db
Mic	(〃)	〃	65 db

*through weighted network as per ASA Z24,3-1944 (40 db-A)

AC outlets : Switched……2
Unswitched……1

Warm-up Time for TA-1120

Integrated Stereo Amplifier TA−1120 which have been in stock or not used for a long time, it takes several minutes to start operation after Power Switch is set on for the first time. It is due to Electrolytic Capacitor in Muting Relay Circuit which serves to give proper time-lag (usually 6～7 seconds) to the Amplifier.

When Electrolytic Capacitor is left unused, leakage current value increases and it takes much more time than usual for Electrolytic Capacitor to charge up to normal voltage.

It gives no affect to the natural performance of Amplifier itself.

Upon the reports so far received and the result of investigation, attention should be paid to the following points.

1. It does not engender excessive time-lag to leave the unit unused for about one month.
2. It takes 2 or 3 minutes at longest to start operation, however only one set took 10 minutes in very rare case.

We hope you will take this phenomena in throughly especially when you set Power Switch on in customer's presence for the first time.

This Service Manual for TA-1120 is mainly written for channel 1 [Left Channel]. That same can be said about channel 2 [Right Channel].

Method of Disassembling the Set

(I) Removal of main amplifier and power supply block.

(a) Remove four machine screws from both side of the chassis cover to take it off.

(b) Remove five screws from bottom of chassis to release the back panel block as shown in Fig. 1.

(c) Unsolder the mylar capacitor (C501) from main amplifier, then remove the two screws as shown in Fig.2. Now the muting circuit board can be removed.

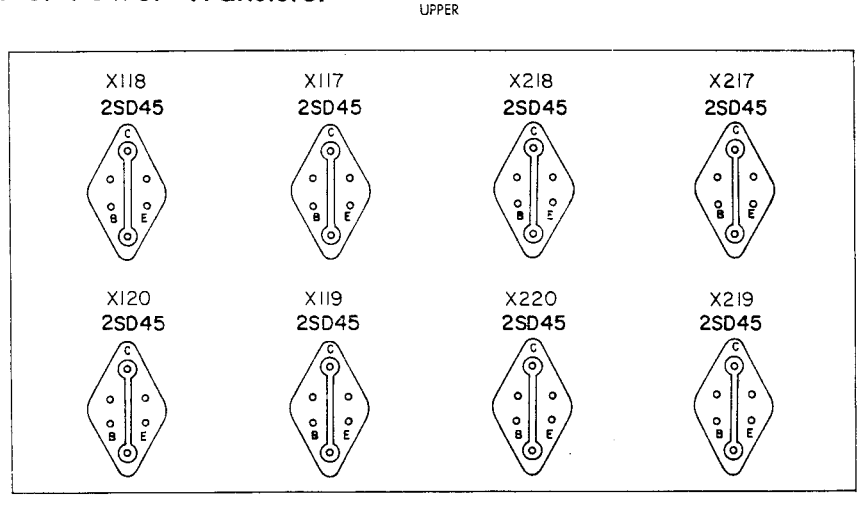
(d) Remove the five screws from main amplifier and power supply chassis as shown in Fig.3, so you can turn the block to make the circuit board up as shown in Fig.4.

(II) Removal of control panel block. (preamplifier block)

(a) After take the chassis cover off, remove two screws from the bottom of chassis (Fig. 1), and then remove four screws from side of the chassis as shown in Fig. 4, now you can separate control panel block from chassis.

(b) The service will be easily done after removing control panel and preamplifier block respectively. (Fig. 5)

Location of Power Transistor



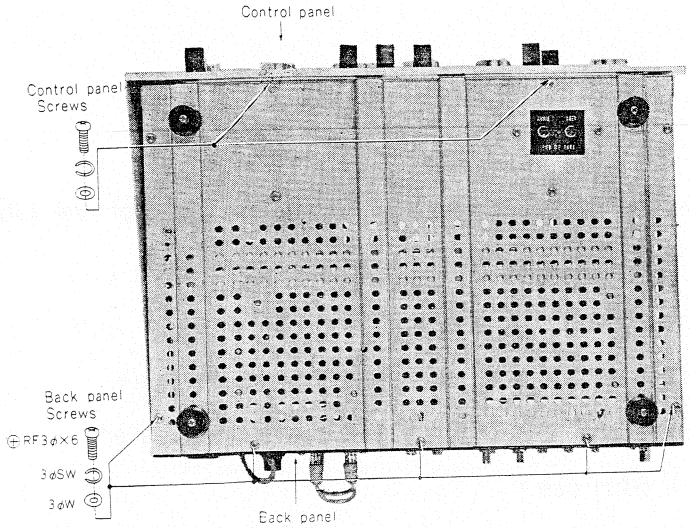


Fig. 1

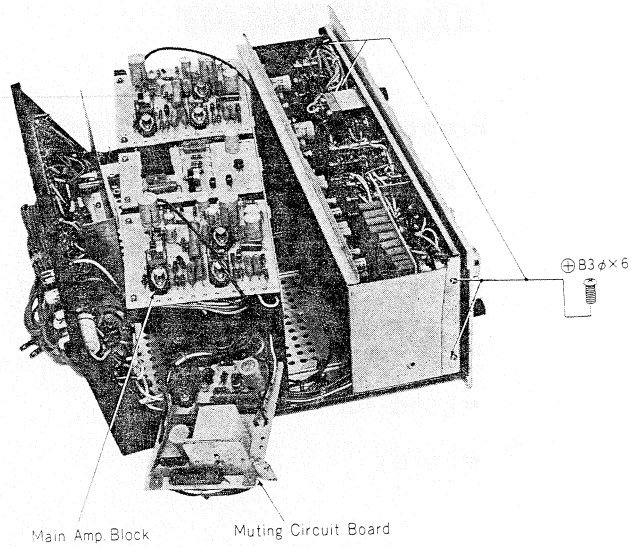


Fig. 4

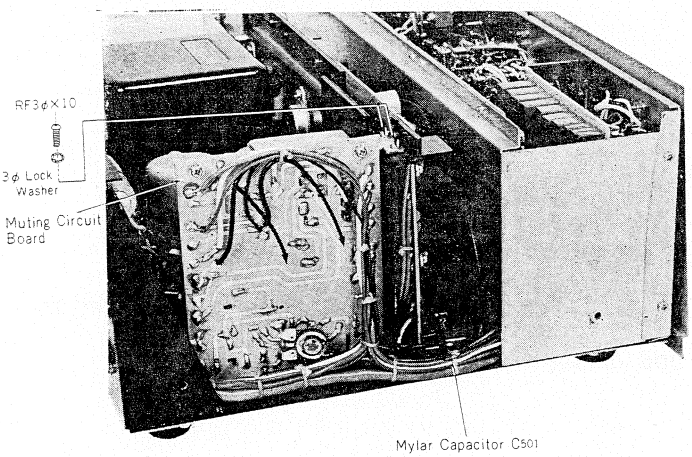


Fig. 2

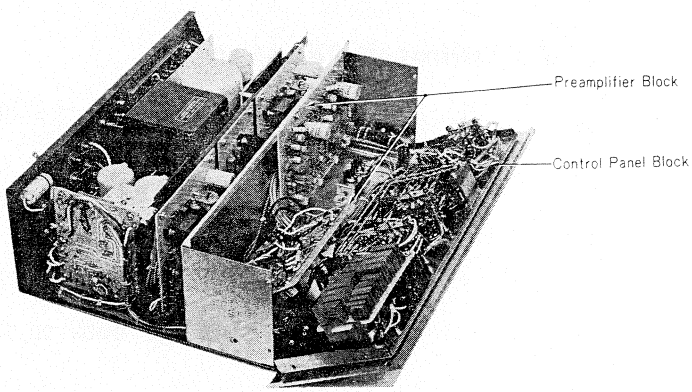


Fig. 5

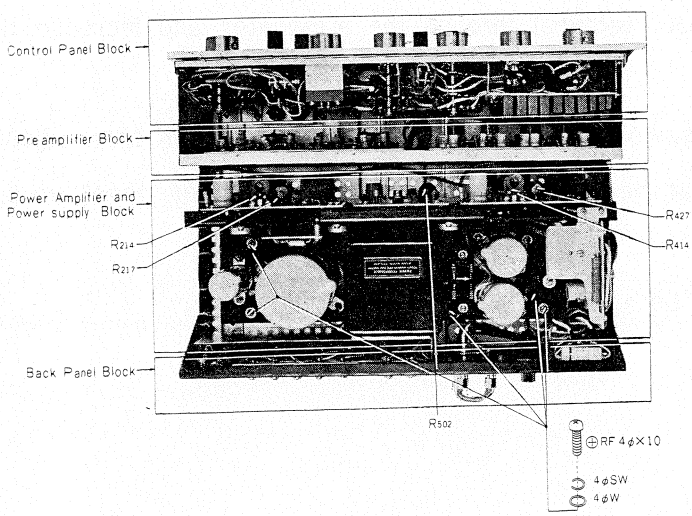


Fig. 3

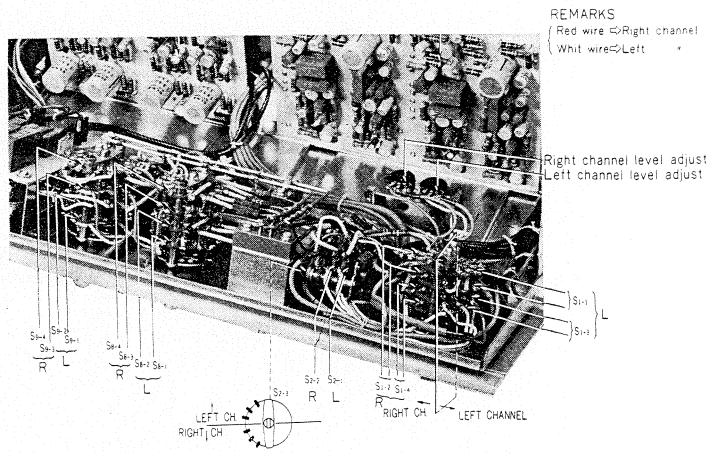


Fig. 6

ADJUSTMENT

Preparation for adjustment

* Voltage Selector Plug :	Insert the Plug so that the top arrow mark of the plug points to the proper voltage figure.
* DC Balance Contorl (R217, 417) :	Turn clockwise to the full.
* Compensation Diode :	Check that the Diode is attached to heat sink.
* Load for output :	Connect an 8 ohms resistor instead of Speaker.
* Fuse :	Set a 5A Fuse.

(A) Balancer Adjustment.

1. Feed a 1KHz signals of −10dBs to the right and left Tuner input terminal.
2. Set Function selector switch (S2) to Tuner position.
3. Connect a V.T.V.M. across the output jack of preamplifier and the ground.
4. Adjust the Balance Control R174, 374 (10K ohms B) so that V.T.V.M. indicates the same output voltage both on left and on right channels.

(B) AC Balance Adjustment.

1. Connect an oscilloscope and V.T.V.M. across the 8 ohms load resistor.
2. Feed a 1KHz Signal to the input terminal through the attenuator and increase the signal gradually.
3. When the wave form on the oscilloscope is slightly clipped, adjust 50K ohms adjustable resistor (R214,414) so that the both upper side and lower side of waveform are clipped at the same time.
4. Make the above procedures on both channels.

(C) Current Adjustment at Zero Signal.

1. Adjust the input signal to zero (less than −50dBs.)
2. Connect voltmeter (multitester) across the 0.5 ohms resistor (R223～226, R423～426).
3. Adjust the 200 ohms adjustable resistor (R217, 417) to obtain 25mV reading on the voltmeter.
4. Repeat the above (B) procedures adjustment.

(D) Circuit Breaker Adjustment.

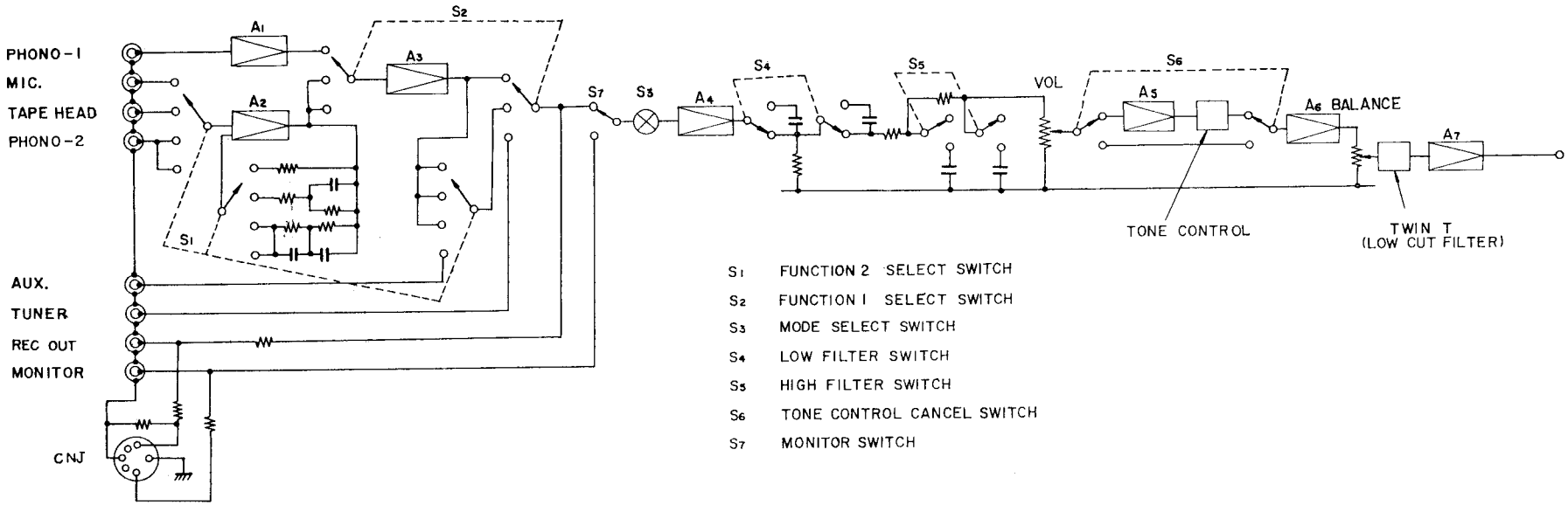
Make it a rule to adjust the circuit breaker block after repairing it, before connect it to amplifier.

1. Turn the 200 ohms adjustable resistor (R502) counter clockwise to the full.
2. Supply the constant voltage of DC 2V ±0.02V to Trigger Input.
3. Supply 85V between B+ and E.
4. Connect the voltmeter across the B-out and E.
5. Turn the 200 ohms adjustable resistor (R502) clockwise, and fix it when the voltmeter indicates 0V on the dial.
6. Check that the circuit breaker works with the input from both D21, D25.

Other Items for Confirmation:

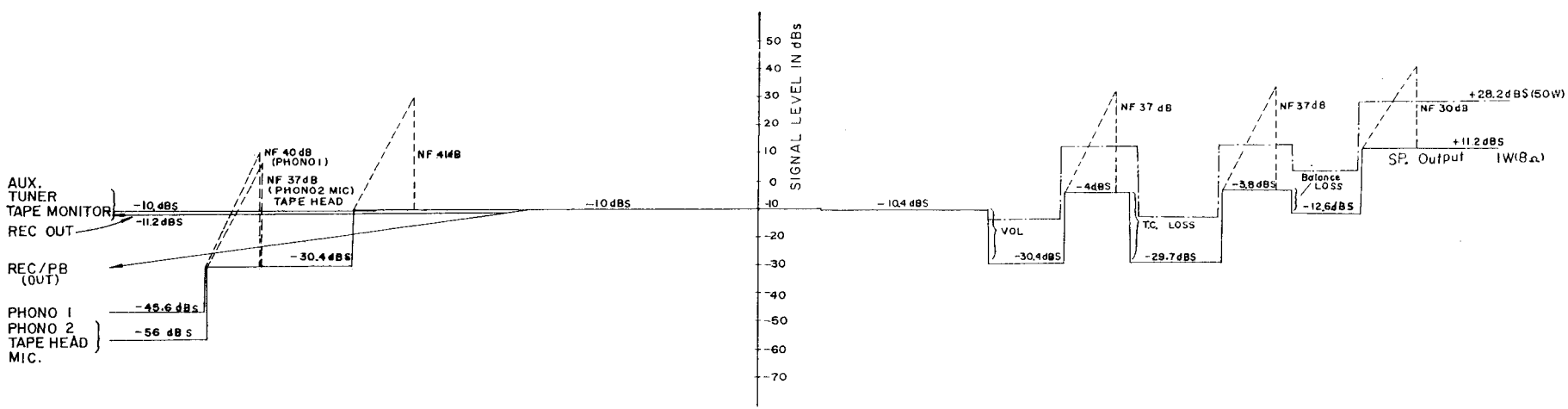
1. Relay works within 15sec. after Power Switch is set on for the first time, and it will be 4～10 sec. for the second time.
   The difference of time between channel 1 and channel 2 is within 10 sec.
2. Phase of both channels must be same.
3. The difference of output level between channel 1 and channel 2 must be less than 2 dB., when the input level control knob set to maximum level position.
4. Output level must be decreased to zero by adjusting the input level control knob.
5. When short-circuit the speaker output, the circuit breaker must work perfectly.

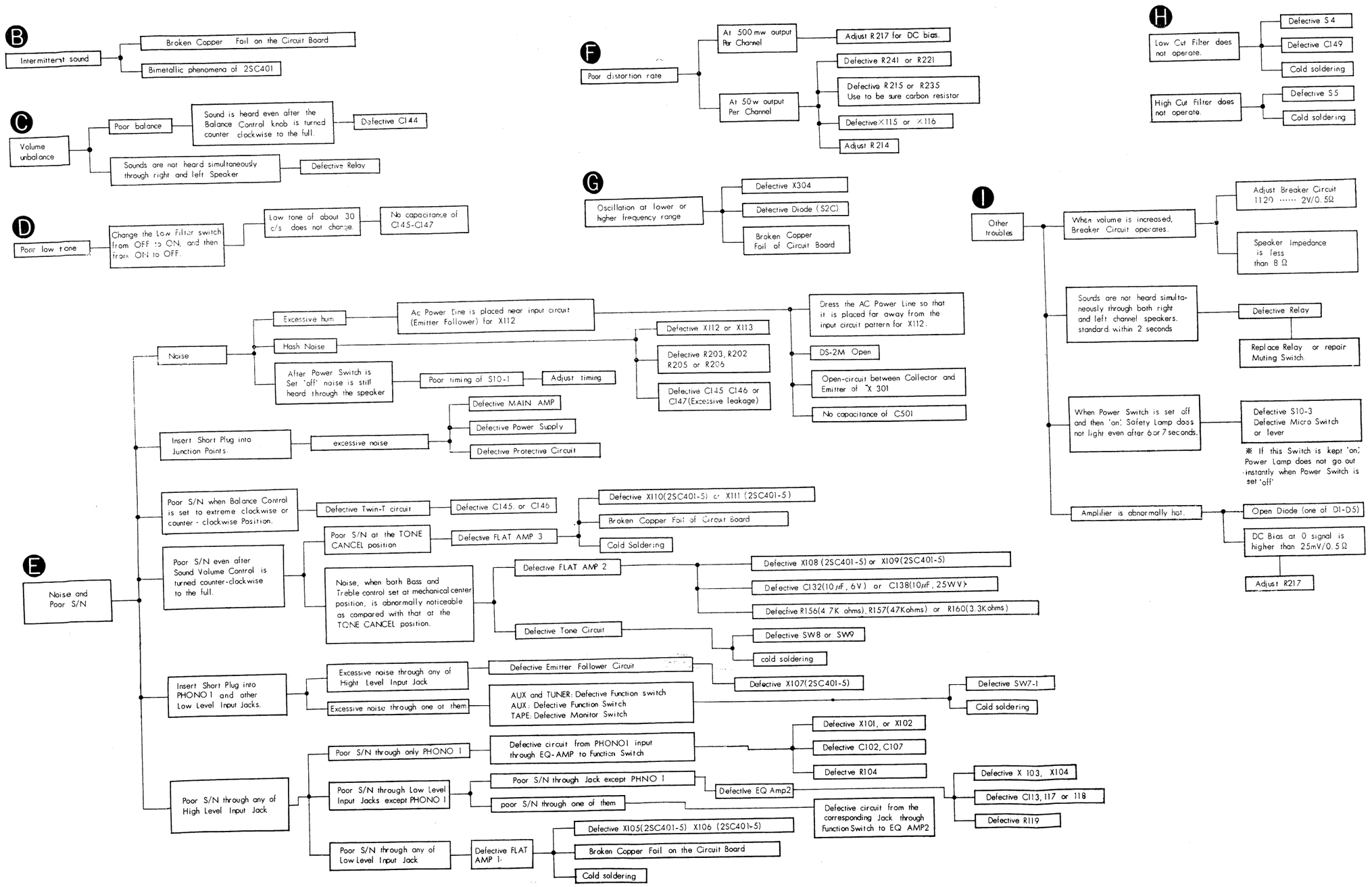
TA-1120 BLOCK DIAGRAM



S1 FUNCTION 2 SELECT SWITCH
S2 FUNCTION 1 SELECT SWITCH
S3 MODE SELECT SWITCH
S4 LOW FILTER SWITCH
S5 HIGH FILTER SWITCH
S6 TONE CONTROL CANCEL SWITCH
S7 MONITOR SWITCH

TA-1120 LEVEL DIAGRAM




B
Intermittent sound
Broken Copper Foil on the Circuit Board
Bimetallic phenomena of 2SC401
C
Volume unbalance
Poor balance
Sound is heard even after the Balance Control knob is turned counter clockwise to the full.
Defective C144
Sounds are not heard simultaneously through right and left Speaker
Defective Relay
D
Poor low tone
Change the Low Filter switch from OFF to ON, and then from ON to OFF.
Low tone of about 30 c/s does not change
No capacitance of C145-C147
F
Poor distortion rate
At 500 mw output Per Channel
Adjust R217 for DC bias.
Defective R241 or R221
At 50w output Per Channel
Defective R215 or R235 Use to be sure carbon resistor
Defective X115 or X116
Adjust R214
G
Oscillation at lower or higher frequency range
Defective X304
Defective Diode (S2C)
Broken Copper Foil of Circuit Board
H
Low Cut Filter does not operate.
Defective S4
Defective C149
Cold soldering
High Cut Filter does not operate.
Defective S5
Cold soldering
I
Other troubles
When volume is increased, Breaker Circuit operates.
Adjust Breaker Circuit 1120 ····· 2V/0.5Ω
Speaker Impedance is less than 8 Ω
Sounds are not heard simultaneously through both right and left channel speakers. standard within 2 seconds
Defective Relay
Replace Relay or repair Muting Switch
When Power Switch is set off and then 'on', Safety Lamp does not light even after 6 or 7 seconds.
Defective S10-3 Defective Micro Switch or lever
※ If this Switch is kept 'on', Power Lamp does not go out instantly when Power Switch is set 'off'
Amplifier is abnormally hot.
Open Diode (one of D1-D5)
DC Bias at 0 signal is higher than 25mV/0.5Ω
Adjust R217
E
Noise and Poor S/N
Noise
Excessive hum
Ac Power Line is placed near input circuit (Emitter Follower) for X112
Dress the AC Power Line so that it is placed far away from the input circuit pattern for X112.
Hash Noise
Defective X112 or X113
Defective R203, R202 R205 or R206
DS-2M Open
Defective C145 C146 or C147(Excessive leakage)
Open-circuit between Collector and Emitter of X 301
No capacitance of C501
After Power Switch is Set 'off' noise is still heard through the speaker
Poor timing of S10-1
Adjust timing
Insert Short Plug into Junction Points.
excessive noise
Defective MAIN AMP
Defective Power Supply
Defective Protective Circuit
Poor S/N when Balance Control is set to extreme clockwise or counter - clockwise Position.
Defective Twin-T circuit
Defective C145 or C146
Poor S/N even after Sound Volume Control is turned counter-clockwise to the full.
Poor S/N at the TONE CANCEL position
Defective FLAT AMP 3
Defective X110(2SC401-5) or X111 (2SC401-5)
Broken Copper Foil of Circuit Board
Cold Soldering
Noise, when both Bass and Treble control set at mechanical center position, is abnormally noticeable as compared with that at the TONE CANCEL position.
Defective FLAT AMP 2
Defective X108 (2SC401-5) or X109(2SC401-5)
Defective C132(10μF, 6V) or C138(10μF, 25WV)
Defective R156(4.7K ohms), R157(47Kohms) or R160(3.3Kohms)
Defective Tone Circuit
Defective SW8 or SW9
cold soldering
Insert Short Plug into PHONO 1 and other Low Level Input Jacks.
Excessive noise through any of Hight Level Input Jack
Defective Emitter Follower Circuit
Defective X107(2SC401-5)
Excessive noise through one of them
AUX and TUNER: Defective Function switch
AUX: Defective Function Switch
TAPE: Defective Monitor Switch
Defective SW7-1
Cold soldering
Poor S/N through any of High Level Input Jack
Poor S/N through only PHONO 1
Defective circuit from PHONO1 input through EQ-AMP to Function Switch
Defective X101, or X102
Defective C102, C107
Defective R104
Poor S/N through Low Level Input Jacks except PHONO 1
Poor S/N through Jack except PHNO 1
Defective EQ Amp2
Defective X 103, X104
Defective C113, 117 or 118
Defective R119
poor S/N through one of them
Defective circuit from the corresponding Jack through Function Switch to EQ AMP2
Poor S/N through any of Low Level Input Jack
Defective FLAT AMP 1
Defective X105(2SC401-5) X106 (2SC401-5)
Broken Copper Foil on the Circuit Board
Cold soldering

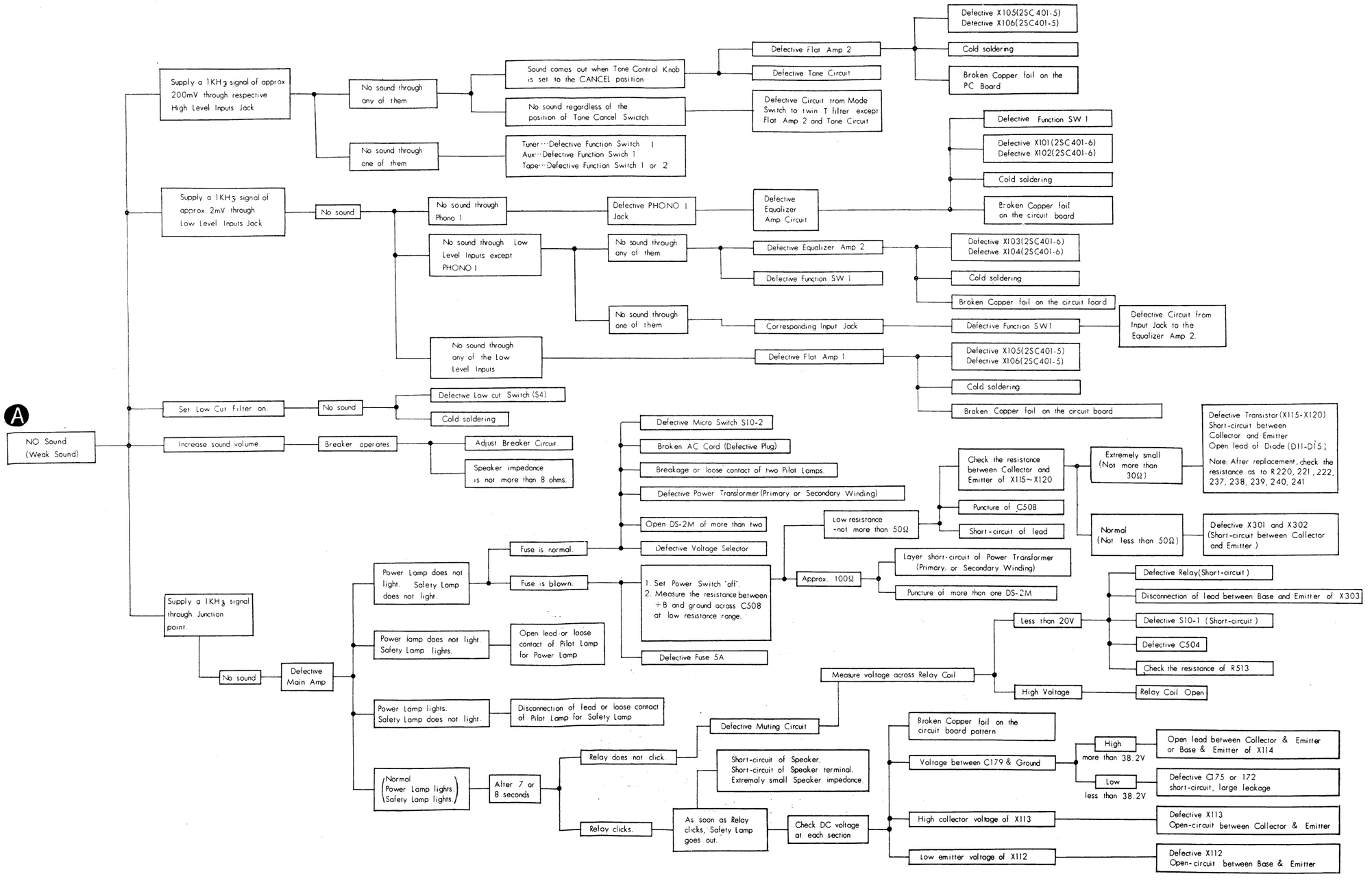
TROUBLE SHOOTING for TA-1120

Poor Sound Volume

- NO Sound (Weak Sound) ····· A
- Intermittent Sound ····· B
- Volume unbalance ····· C

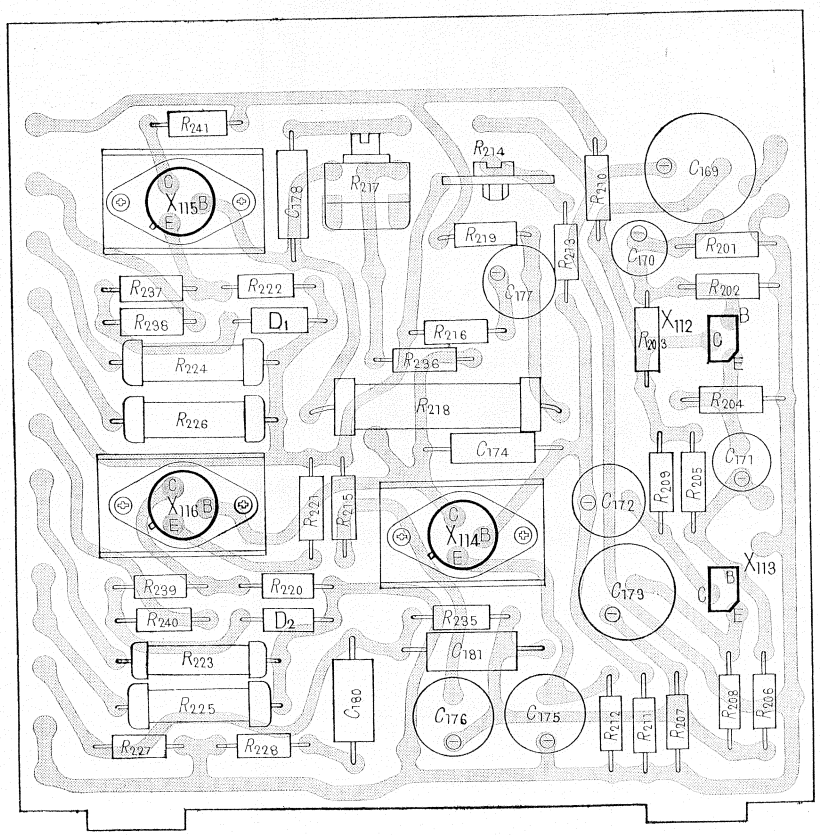
Poor Tone Quality

- Poor low tone ····· D
- Noise & Poor S/N ····· E
- Poor distortion rate ····· F
- Oscillate at low or high frequency range ····· G
- Low Cut filter does not operate ····· H
- Other troubles ····· I



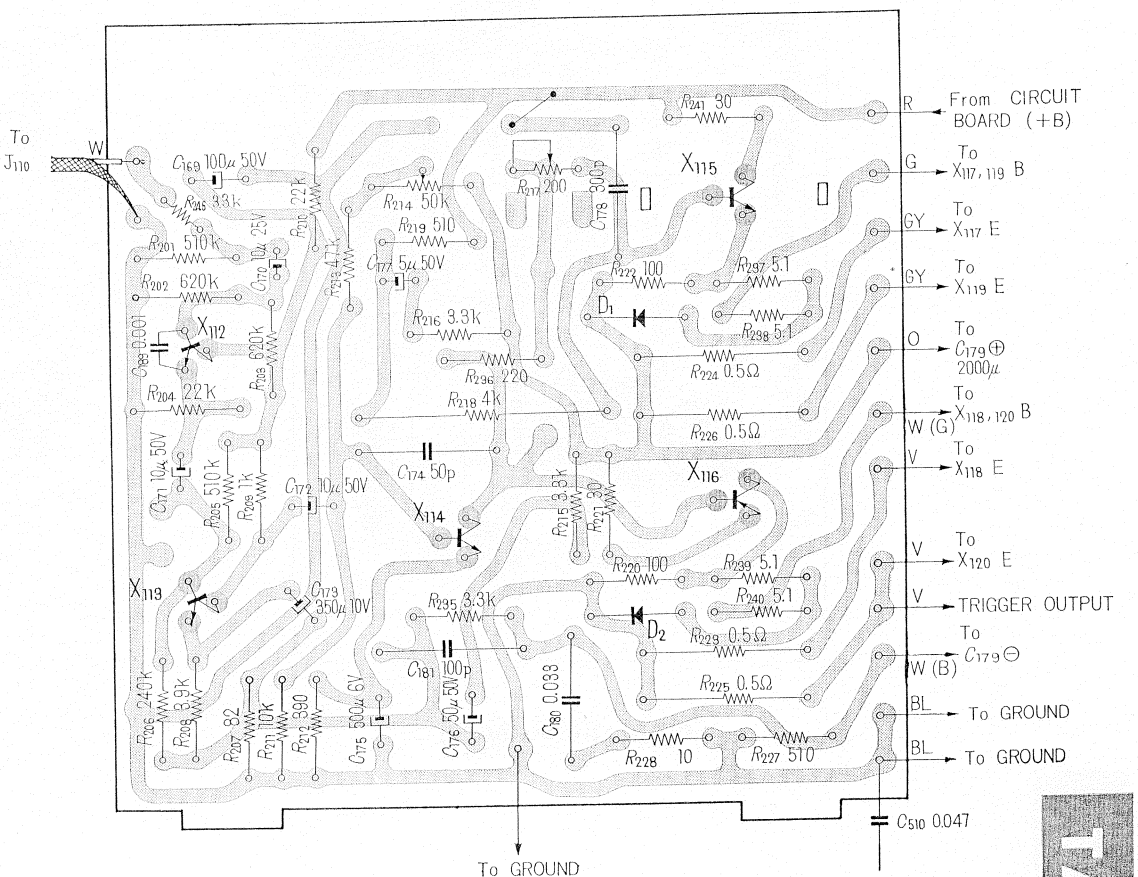
POWER AMPLIFIER BOARD

— Components Side —



R_{246}, C_{189}, D_{11} ~ D_{15} } are mounted on conductor side

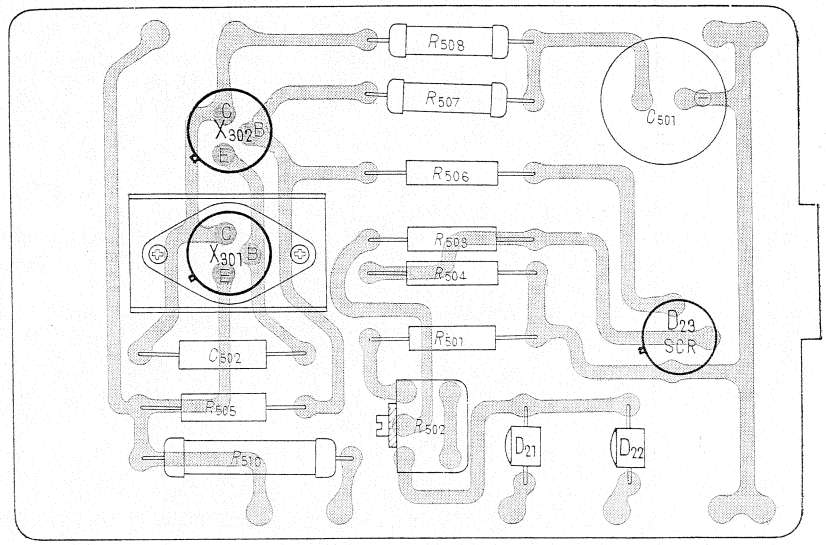
— Conductor Side —



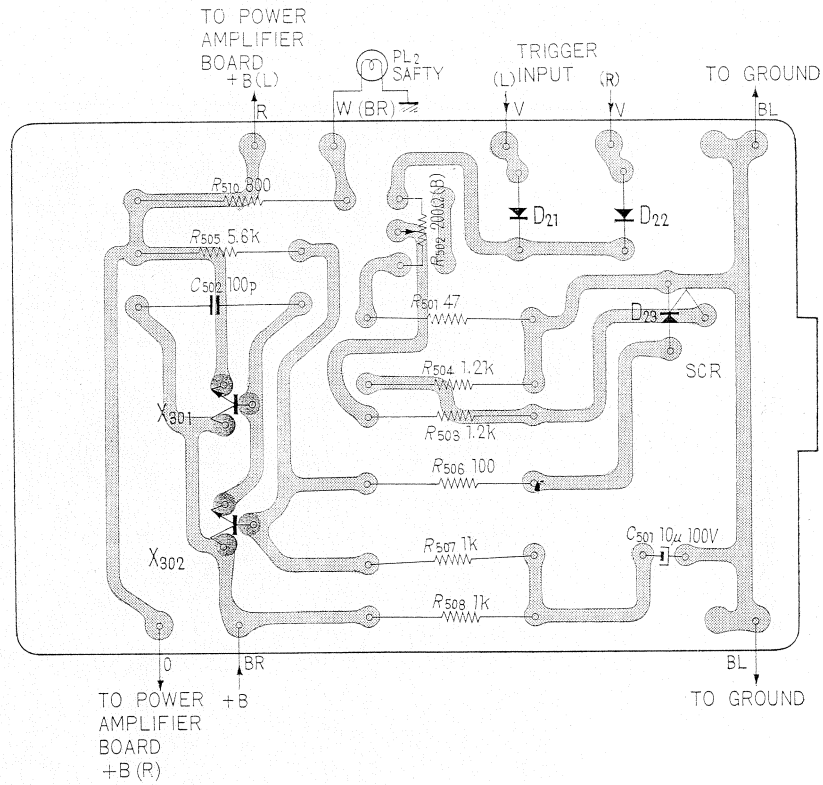
TA-1120

CIRCUIT BREAKER BOARD

—Components Side—

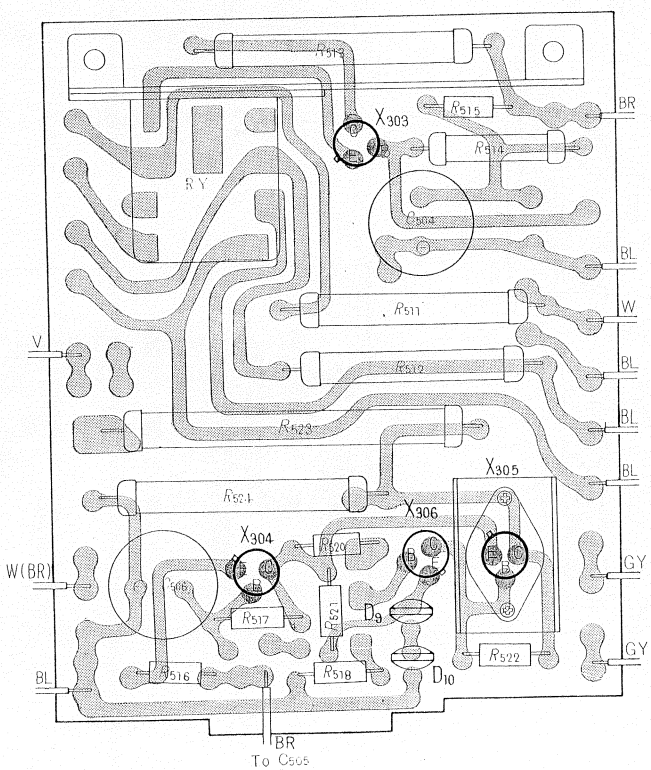


—Conductor Side—

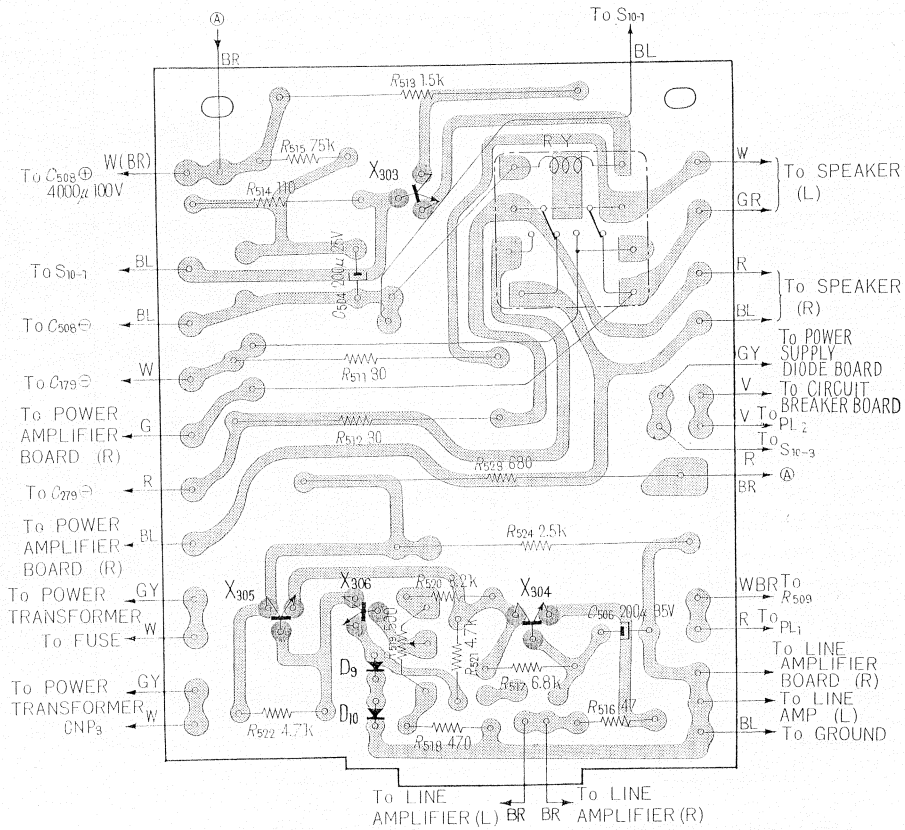


MUTING BOARD

— Components Side —

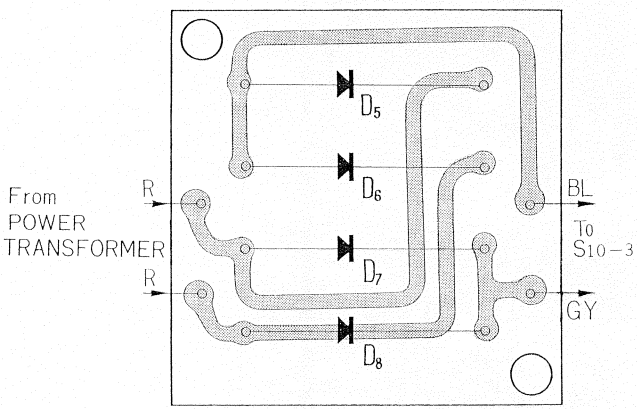


— Conductor Side —



POWER SUPPLY DIODE BOARD

— Conductor Side —



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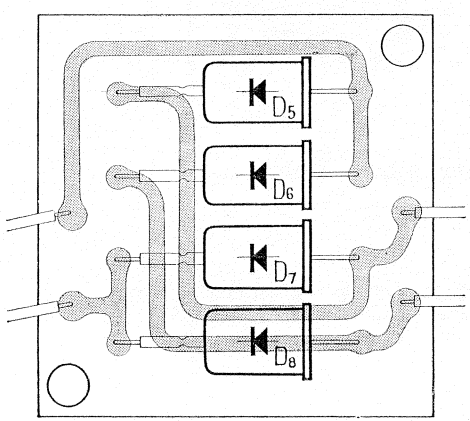
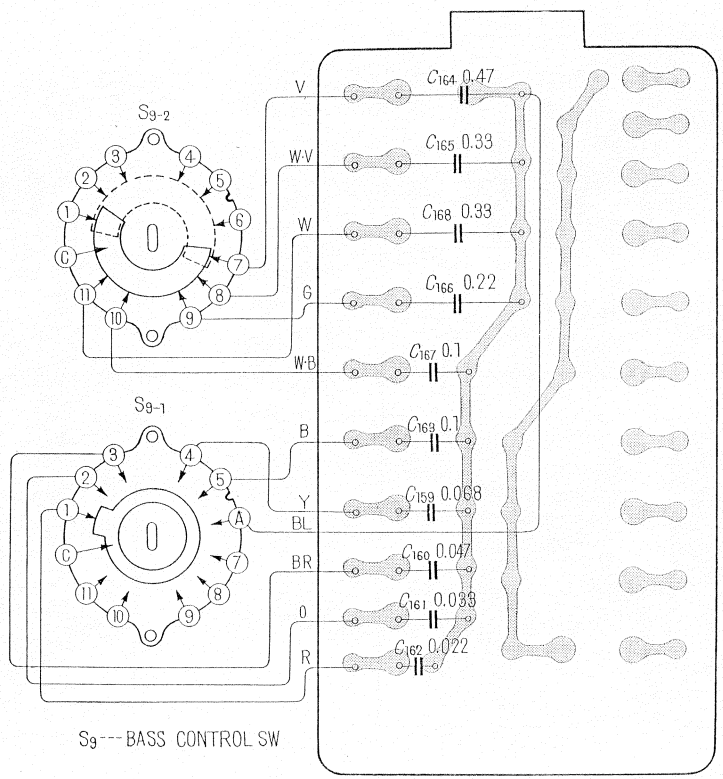


TONE CONTROL CAPACITOR BOARD

— Conductor Side —



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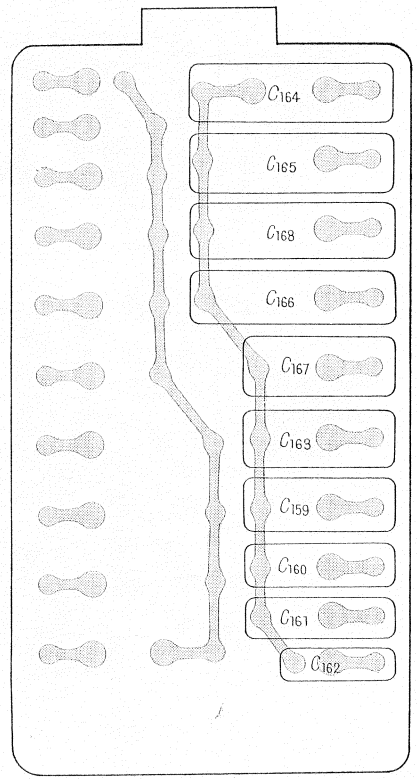
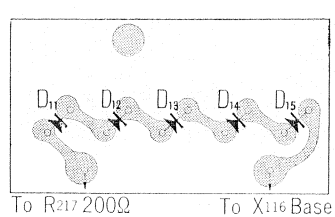
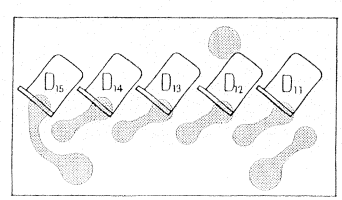


THERMO COMPENSATION DIODE BOARD

— Conductor Side —

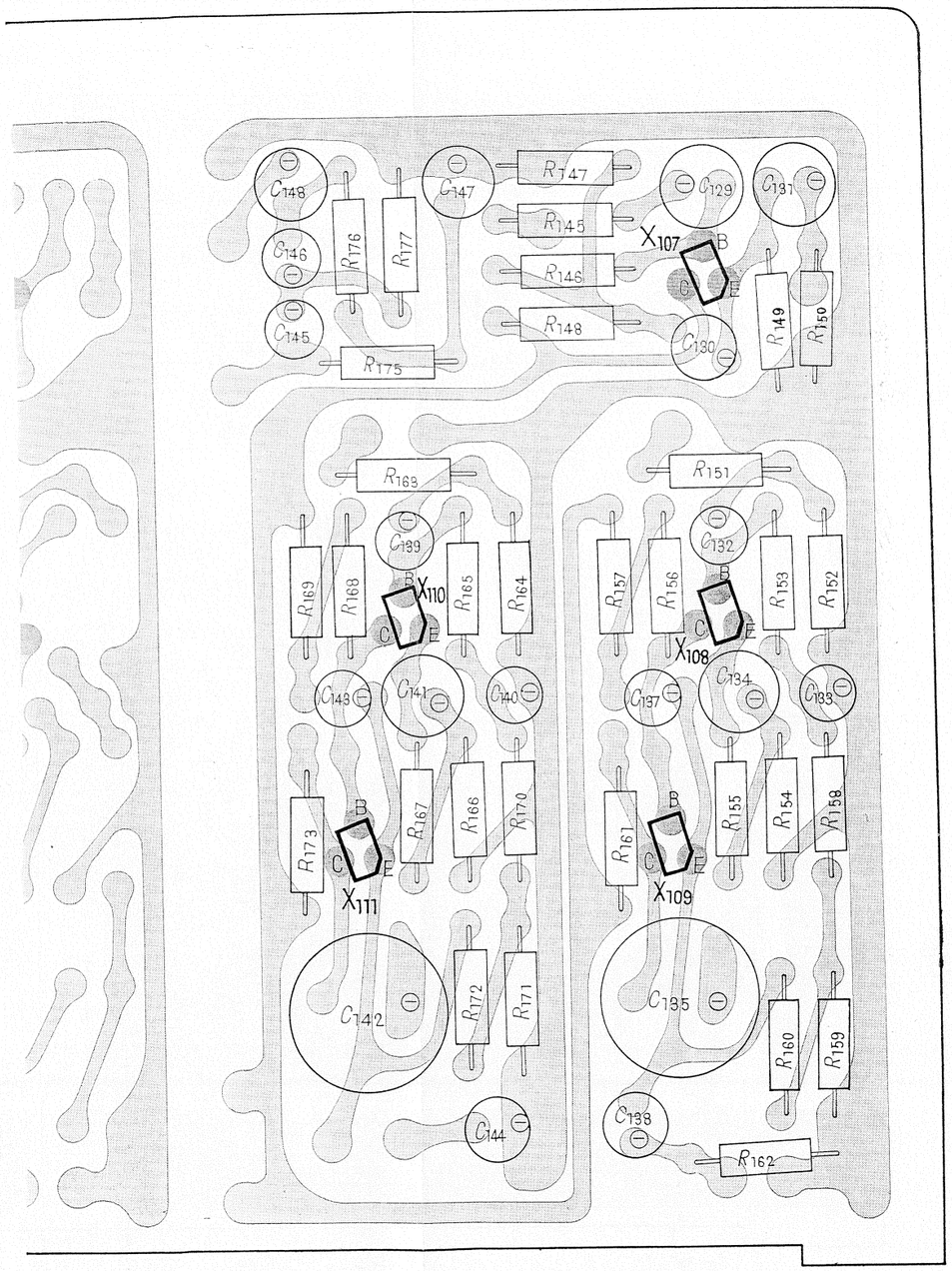


— Components Side —

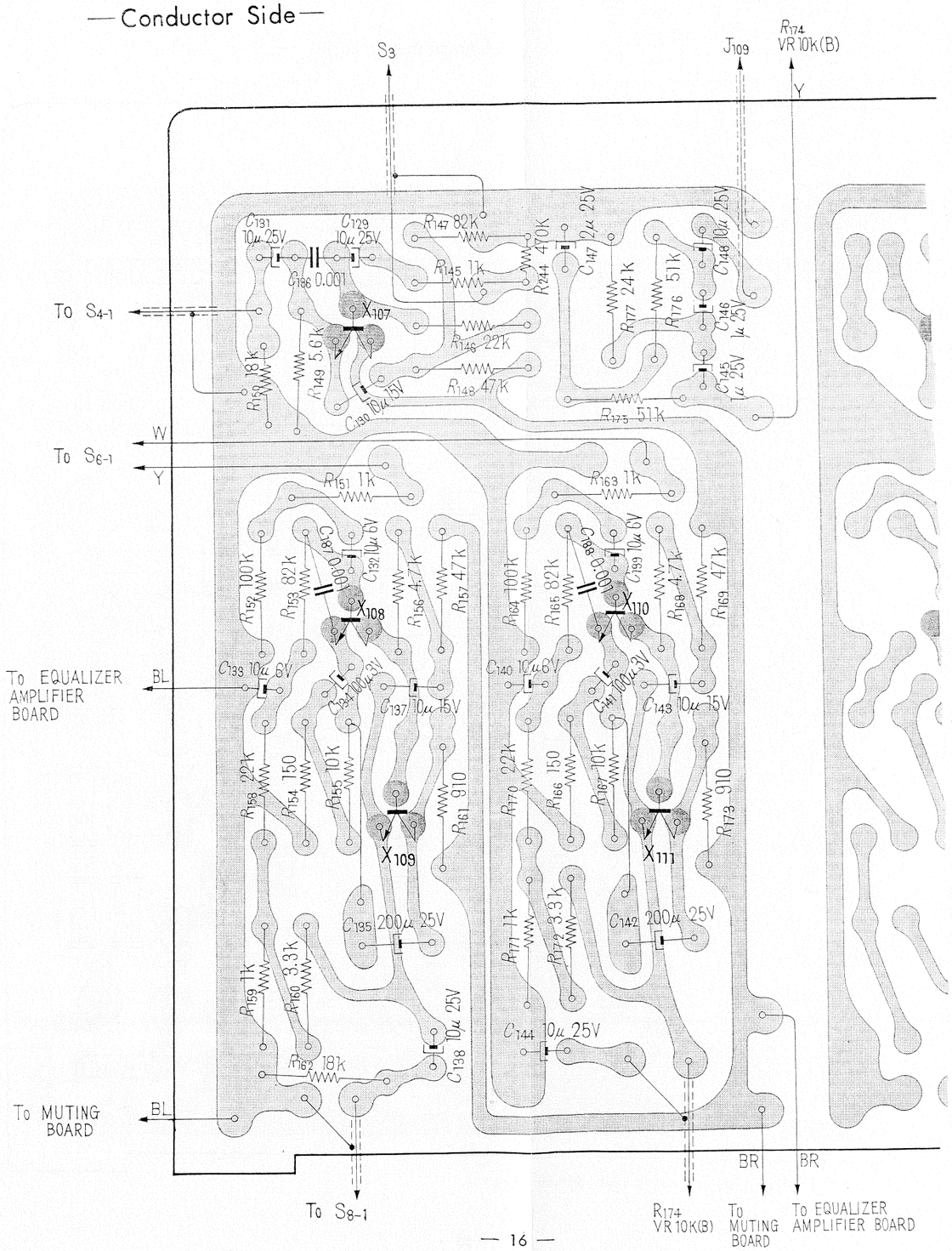


LINE AMPLIFIER BOARD

— Components Side —



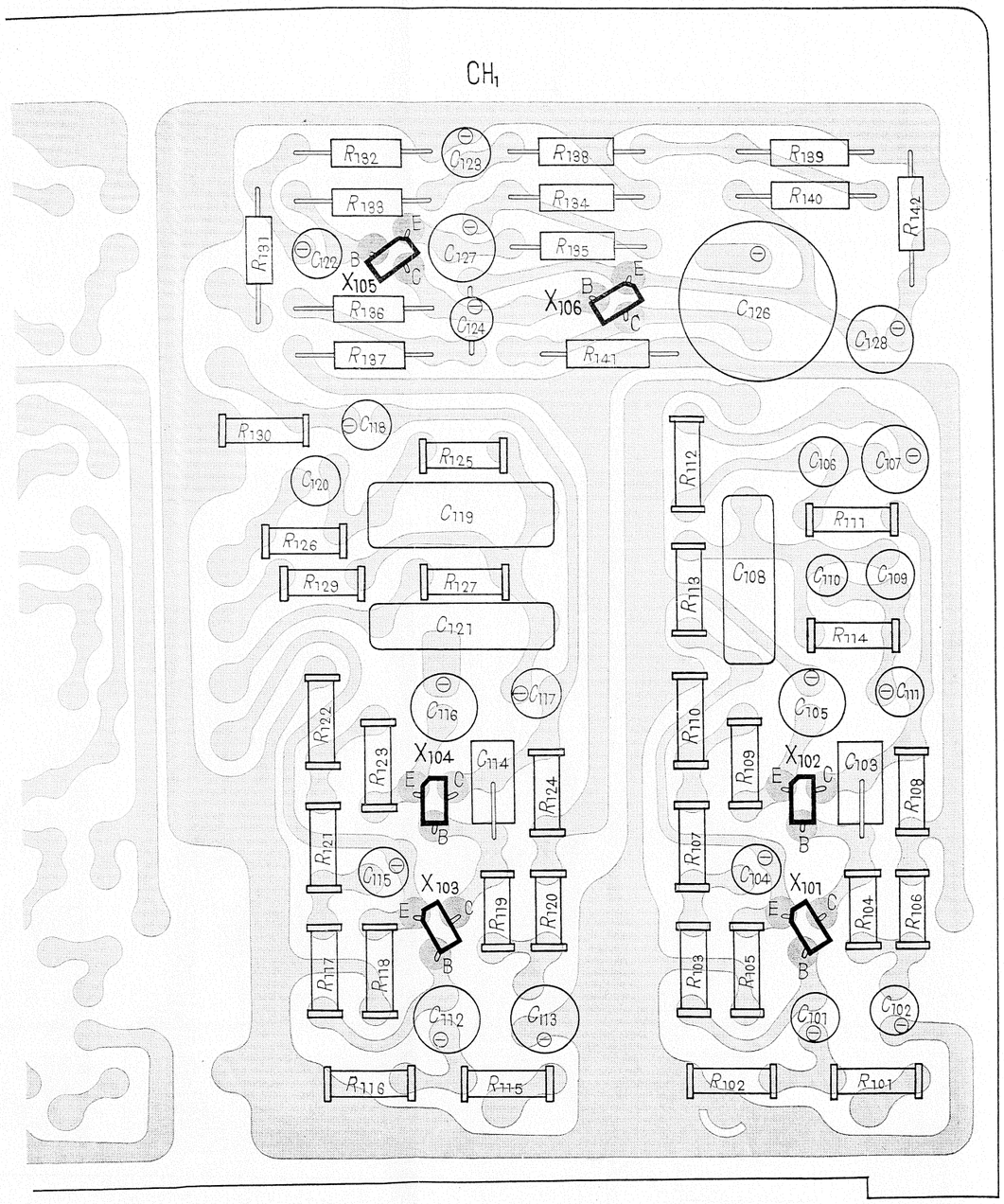
— Conductor Side —



R_{244}, $C_{186, 187, 188}$ } are mounted on conductor side

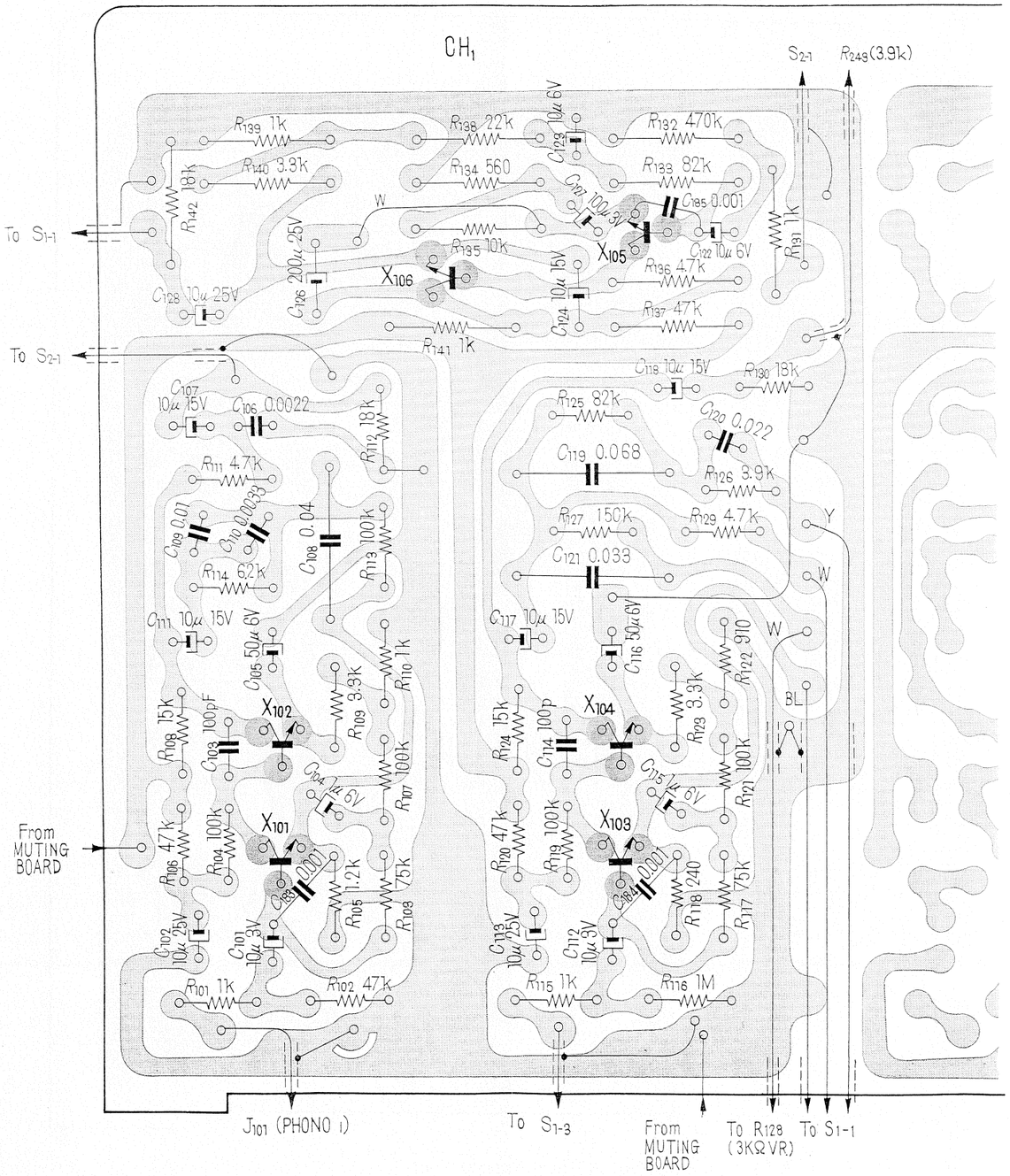
EQUALIZER AMPLIFIER BOARD

—Components Side—

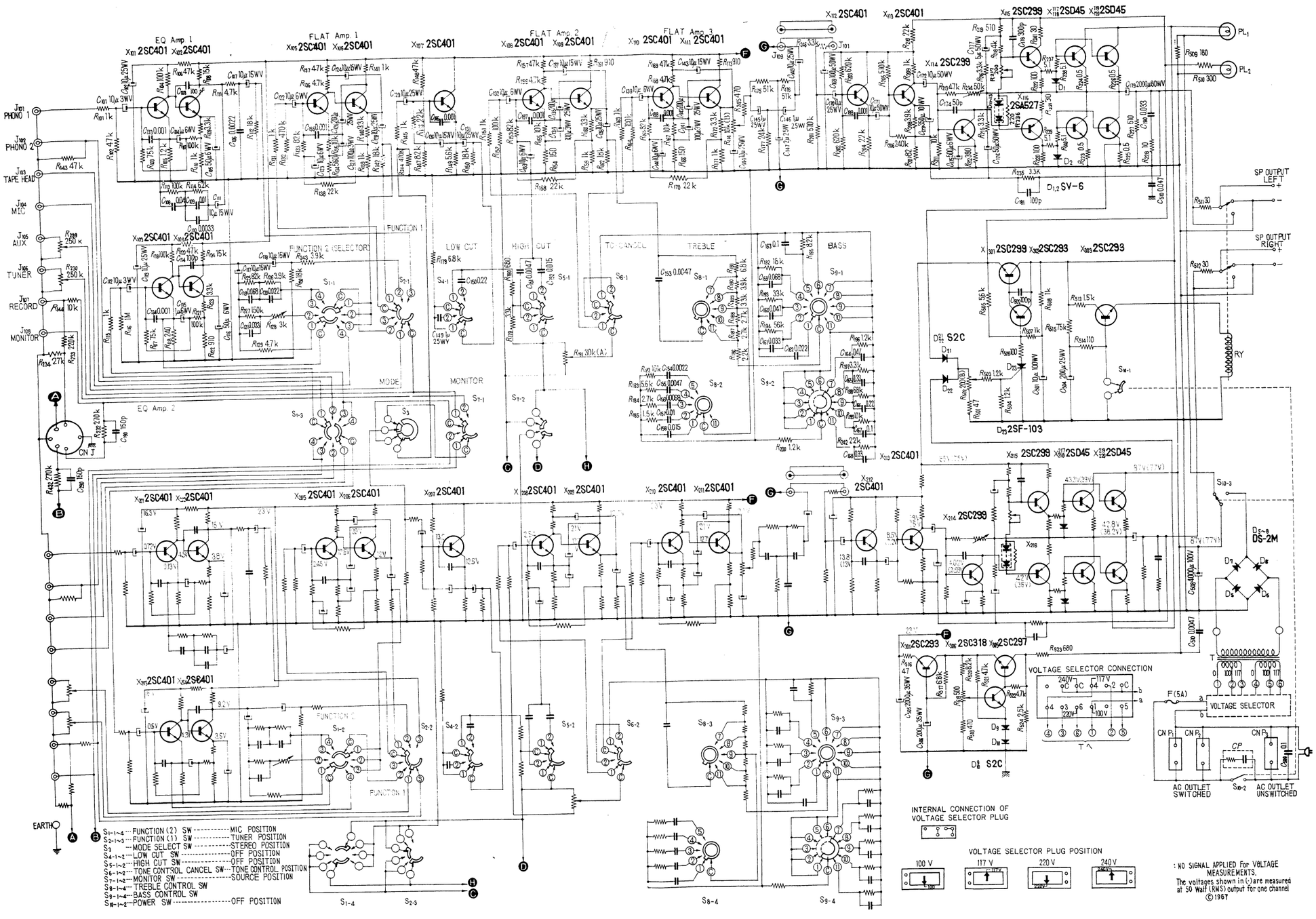


$C_{183, 184, 185}$ are mounted on conductor side

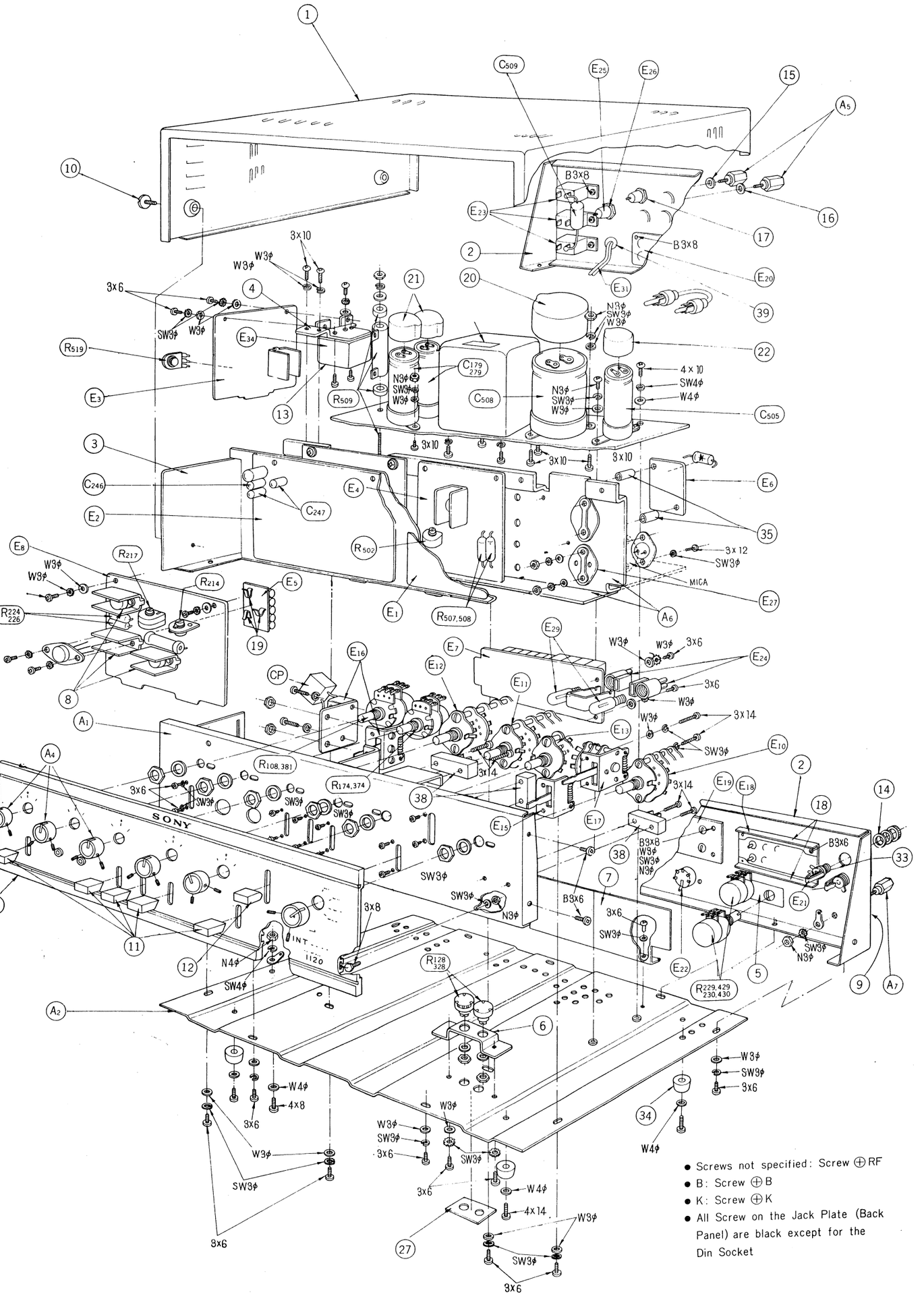
—Conductor Side—



TA-1120 CIRCUIT DIAGRAM



EXPLODED DIAGRAM



Mechanical Parts

Ref. No.	Part No.	Description	Q'ty
A1	X-20299-01-	Panel Ass'y, chassis; front	1
A2	X-20299-02-	Plate Ass'y, chassis; bottom	1
A3	X-20299-03-	Panel Ass'y, control incl.	1
A3-1	2-029-908	Panel, control	(1)
A3-2	2-031-956-01	Escutcheon, pilot lamp	(2)
A3-3	-955-01	Lens, pilot lamp; red	(1)
A3-4	-955-02	Lens, pilot lamp; green	(1)
A4	X-20299-04-	Knob Ass'y, control incl.; gold	6
A4-1	2-029-911-	Knob, control; gold	(1)
A4-2	7-621-715-40	Screw, control knob 4×8	(2)
A5	X-20299-05-	Terminal Ass'y, speaker output; middle type	4
A6	X-20299-06-	Chassis Ass'y, power amplifier	1
A7	X-20319-01-	Terminal Ass'y, earth; small type	1
1	2-029-921-	Cabinet, cover; black	1
2	-922-	Plate, jack	1
3	-923-	Chassis, pre-amplifier	1
4	-924-	Plate, relay	1
5	-925-	Plate, volume control	1
6	-926-	Bracket, tape equalizer adjustable resistor	1
7	-927-	Plate, hum shield; terminal side	1
8	-928-	Heat Sink 2SC299	8
9	-929-	Label, specification	1
10	-930-	Screw, case cover	4
11	-931-	Knob, power on/off, tone and monitor; dark brown	5
12	-932-	Knob, function; dark, brown	1
13	-933-	Case Cover, relay; white	1
14	-934-	Spacer, microphone jack; black	2
15	-934-02	Spacer, speaker output; blue	2
16	-935-12	Spacer, speaker output; red	2
17	-936-	Spacer, speaker output; fiber	4
18	-937-	Plate, phono jack mounting plate reinforcing	2
19	-938-	Plate, printed circuit board	6
20	-939-	Cover, electrolytic capacitor; large	1
21	-940-	Cover, electrolytic capacitor; middle	2
22	-941-	Cover, electrolytic capacitor; small	1
23	-942-	Bracket, wire retainer	1
24	-943-	Cushion	1
25	-944-	Cushion, styro-foam	2
26	-945-	Carton	1
27	-947-	Label, "TAPE EQ. Adj."	1
28	-949-	Felt, vibration absorber; white	1
29	-950-	Spacer t=0.5	1
30	-951-	Plate, nut	1
31	-952-	Wire Retainer	2
32	-953-	Label, voltage	1
33	0-051-113-	Spacer, jack; white	2
34	-263-	Foot, rubber	4
35	3-002-403-05	Spacer, 6φ	2
36	-408-15	Spacer, 6φ	2
37	3-413-100-	Bag, polyethylene	1
38	3-418-169-	Board, 2P terminal	4
39	3-410-032-	Stopper, cord; small	1
40	3-103-527-	Staple, wire retainer; rubber	3
41	3-701-030-	Label, serial No.	1
42	3-790-702-11	Instruction Manual	1
43	X-44900-02	Cloth; polishing	1
44	1-506-113-11	Plug, phonolock; black	6
45	-105-01	Plug, phono; red	7
46	-105-02	Plug, phono; black	7
47	2-029-946-	Bag, vinyl	1
48	3-793-038-	Sheet, check	1
49	3-701-020-	Bag, check sheet	1
50	-026-	Lebel, tuck	1
51	7-491-001-	Desiccant	1
52	3-793-009-11	Card, inspection	1
	7-621-261-23	Screw, machine +RF 3φ×4	6
	-43	〃 +RF 3φ×6	46
	-53	〃 +RF 3φ×8	13
	-63	〃 +RF 3φ×10	15
	-268-53	〃 +RF 4φ×8	5
	-63	〃 +RF 4φ×10	5
	-83	〃 +RF 4φ×14	4
	-261-73	〃 +RF 3φ×12	16
	-770-25	〃 +B 3φ×6	2
	-22	〃 +B 3φ×6	4
	-49	〃 +B 3φ×6	4
	-39	〃 +B 3φ×8	14
	-561-43	〃 +K 3φ×6	1
	7-621-999-01	Screw, hexagonal, 3φ×8	6
	7-623-208-24	Washer, spring 3φ	92
	-210-24	〃 4φ	9
	-108-12	Washer, plain 3φ	62
	-110-12	〃 4φ	10
	-508-01	Solder Lug 3φ	6
	-510-01	〃 4φ	1
	-408-04	Washer, external tooth 3φ	36
	-410-04	〃 4φ	1
	7-622-108-02	Nut 3φ	57
	-110-02	〃 4φ	1

Electrical Parts (General)

Ref. No.	Part No.	Description	Q'ty
E1'		Ciruit Board, equalizer amp.; mounted	1
E2'		〃 , line amp.; mounted	1
E3'		〃 , muting; mounted	1
E4'		〃 , circuit breaker; mounted	1
E5'		Circuit Board, thermo compensation diode; mounted	1
E6'		〃 , power supply diode; mounted	1
E7'		〃 , tone control capacitor; mounted	1
E8'		〃 , power amplifier; mounted	1
E1	1-538-341-	Circuit Board, equalizer amp.;	1
E2	-342-	〃 , line amp.;	1
E3	-343-	〃 , muting;	1
E4	-344-	〃 , circuit breaker;	1
E5	-345-	〃 , thermo compensation diode;	2
E6	-346-	〃 , power supply diode;	1
E7	-347-	〃 , tone control capaci; tor;	1
E8	-348-	〃 , power amp.;	1
E9	1-441-227-	Transformer, power	1

Ref. No.	Part No.	Description	Q'ty
E10	1-513-290-	Switch, function; rotary; S1	1
E11	1-513-288-	Switch, treble; rotary S8	1
E12	-289-	Switch, bass; rotary S9	1
E13	-295-	Switch, mode; rotary S3	1
E14	-291-	Switch, low cut, high cut and cancel; lever action S4, 5, 6	3
E15	-292-	Switch, monitor; lever action S7	1
E16	-293-	Switch, power on/off; micro S10	1
E17	-294-	Switch, function; lever action S2	1
E18	1-507-162-	Jack, tape head, phono 1, phono 2 tuner and auxiliary; phono J101-103, 201-203, 105, 205, 106, 206	1
E19	-163-	Jack, rec. output and monitor; phono J107, 207, 102, 208	1
E20	-164-	Jack, pre-amplifier, power amplifier junction check point; phono J109, 209, 110, 210	1
E21	1-507-108-	Jack, microphone input; phono J104, 204	2
E22	1-509-029-	Socket, Rec./P.B. CNJ	1
E23	-015-	Socket, AC CNP1-3	3
E24	1-517-021-	Socket, pilot lamp	2
E25	1-533-012-	Fuse Post	1
E26	1-532-017-	Fuse 5A	1
E27	1-526-502-	Socket, transistor 2SD45	8
E28	-165-	Socket, voltage adaptor; special	1
E29	1-518-050-	Lamp, pilot	2
E30	1-536-074-	Terminal Strip 1L2P	2
E31	1-534-330-	Cord, AC Power	1
E32	-286-11	Cord, connection	1
E33	-21	Cord, connection	1
E34	1-515-050-	Relay	1

Electrical Parts

Part No.	Description	Q'ty
	Semi-conductors	
	Equalizer Amplifier Section	
	Transistor 2SC401-6 X101-104, 201-204	8
	Transistor 2SC401-5 X105, 205, 106, 206	4
	Line Amplifier Section	
	Transistor 2SC401-5 X107-111 207-211	10
	Power Supply Diode Section	
	Diode DS-2M D5-8	4
	Thermo Compensation Diode Section	
	Diode SV-31 D11-20	10
	Power Amplifier Section	
	Transistor 2SD45-5, 6 X117-120 217-220	8
	Transistor 2SC401-5 X112, 212, 113, 213	4
	Transistor 2SC299-40 (Green Mark) X114, 214, 115, 215	4
	Transistor 2SA527 (TX-141) (Green Mark) X116, 216	2
	Varistor SV-6 D1-4	4
		2
	Circuit Braker Section	
	Transistor 2SC299-30 (Red Mark) X301	1
	Transistor 2SC293-30 (Red Mark) X302	1
	Diode S2C D21, 22	2
	Diode 2SF-103 D23	1
	Muting Section	
	Transistor 2SC299-30 (Red Mark) X303	1
	Transistor 2SC293-40 (Red Mark) X304	1
	Transistor 2SC297-03 (Red Mark) X305	1
	Transistor 2SC318-242(Red Mark) X306	1
	Diode S2C D9, 10	2

Part No.	Description	Q'ty
	Resistor	
	General Items	
1-221-760-	Balance Control 30K ohms combination R181, 381	1
1-221-704-	Volume Control 10K ohms combination R174, 374	1
-705-	Adjustable; auxiliary and tuner input level 250K ohms R229, 429, 230, 430	4
-702-	Adjustable 3K ohms R128, 328	2
1-201-041-	Composition Resistor 10K ohms RC1/2 ±10% R144, 344	2
-054-	47K 〃 〃 〃 R143,343	2
-693-	27K 〃 〃 〃 R234,434	2
-326-	270K 〃 〃 〃 R232,432	2
-085-	3.9K 〃 〃 〃 R243,443	2
-075-	6.8K 〃 RC1/4 〃 R178,378,191, 391,198,398	6
-030-	3.3K 〃 〃 〃 R179,379,189, 389,197,397	6
-779-	68K 〃 〃 〃 R180,380	2
-039-	10K 〃 〃 〃 R182,382,199, 399	4
-034-	5.5K 〃 〃 〃 R183,383	2
-237-	2.7K 〃 〃 〃 R184,384,187, 387,188,388	6
-024-	1.5K 〃 〃 〃 R185,385	2
-028-	2.2K 〃 〃 〃 R186,386	2
-033-	3.0K 〃 〃 〃 R190,390	2
-230-	18K 〃 〃 〃 R192,392	2
-047-	33K 〃 〃 〃 R193,393	2
-057-	56K 〃 〃 〃 R194,394	2
-037-	8.2K 〃 〃 〃 R195,395	2
-288-	1.2K 〃 〃 〃 R196,396,200, 400	4
-243-	22K 〃 〃 〃 R242,442	2
-802-	220K 〃 RC1/2 〃 R233,433	2
-096-	470 〃 〃 〃 R245,445	2
1-205-100-	Enameled 180 ohms 10W ±10% R509 w/mounting bracket	1
	Equalizer Amplifier Section	
	Carbon Resistor	

Part No.	Description	Q'ty
1-203-973-	3.3K ohms RD1/4L ±5% R109,309, 123,314	4
1-203-058-	3 .3K 〃 〃 〃 R140,340	2
-031-	1K ohm 〃 〃 R101,301	2
-095-	47K ohms 〃 〃 R102,302,106, 306,120,320, 137,337	8
-064-	4.7K 〃 〃 〃 R111,211,129, 329,136,336	6
-130-	18K 〃 〃 〃 R112,312 130,330	4
-100-	100K 〃 〃 〃 R113,313	2
-124-	6.2K 〃 〃 〃 R114,314	2
-125-	82K 〃 〃 〃 R125,325	2
-061-	3.9K 〃 〃 〃 R126,326	2
-104-	150K 〃 〃 〃 R127,327	2
	Carbon Resistor	
1-204-910-	1K ohm RD1/4L ±5% R110,310, 115,315	4
-913-	75K ohms 〃 〃 R103,303,117, 317	4
-901-	100K 〃 〃 〃 R104,304,107, 119,319,307, 121,321	8
-909-	15K 〃 〃 〃 R108,124,324, 308	4
-911-	※ 240 〃 〃 〃 R118,318	2
-912-	※ 910 〃 〃 〃 R122,322	2
1-209-903-	※1.2K 〃 〃 〃 R105,305	2
-902-	※ 1M ohm 〃 〃 R116,316	2
	Composition Resistor	
1-201-021-	1K ohm RC1/2 ±10% R131,331, 139,339,141, 341	6
-597-	470K ohms 〃 〃 R132,332	2
-591-	82K 〃 〃 〃 R133,333	2
-083-	560 〃 〃 〃 R134,334	2
-041-	10K 〃 〃 〃 R135,335	2
-087-	22K 〃 〃 〃 R138,338	2
-099-	18K 〃 〃 〃 R142,342	2
	Line Amplifier Section	
	Composition Resistor	
1-201-021-	1K ohm RC1/2 ±10% R145,345, 151,351,159, 359,163,363, 171,371	10
-591-	82K ohms 〃 〃 R147,347,153, 353,165,365,	6
-041-	10K 〃 〃 〃 R155,355,167, 367	4
-054-	47K 〃 〃 〃 R148,348	2
-087-	22K 〃 〃 〃 R146,346,158, 358,170,370	6
-099-	18K 〃 〃 〃 R150,350,162, 362	4
-086-	5.6K 〃 〃 〃 R149,349	2
-061-	100K 〃 〃 〃 R152,352,164, 364	4
-316-	150 〃 〃 〃 R154,354,166, 366	4
-840-	910 〃 〃 〃 R161,361,173, 373	4
-283-	51K 〃 〃 〃 R175,375,176, 376	4
-282-	24K 〃 〃 〃 R177,377	2
-597-	470K 〃 〃 〃 R244,444	2
	Carbon Resistor	
1-203-095-	47K ohms RD1/4L ±5% R157,169, 357,369	4
-064-	4.7K 〃 〃 〃 R156,168,356, 368	4
1-203-058-	3.3K ohms RD1/4L ±5% R160,172 360,372	4
	Power Amplifier Section	
1-221-334-	Adjustable 50K ohms (B) R214,414	2
1-223-010-	Adjustable, wire wound 200 ohms (B) R217,417	2
	Composition Resistor	
1-201-837-	510K ohms RC1/2 ±10% R201,401, 405,205	4
-842-	620K 〃 〃 〃 R202,402,203, 403	4
-087-	22K 〃 〃 〃 R204,404,210, 410	4
-843-	82 〃 〃 〃 R206,406	2
-683-	240K 〃 〃 〃 R207,407	2
-085-	3.9K 〃 〃 〃 R208,408	2
-021-	1K ohm 〃 〃 R209,409	2
-041-	10K ohms 〃 〃 R211,411	2
-472-	390 〃 〃 〃 R212,412	2
-054-	47K 〃 〃 〃 R213,413	2
-084-	3.3K 〃 〃 〃 R216,416,246, 446	4
-845-	510 〃 〃 〃 R219,419,227, 427	4
-100-	100 〃 〃 〃 R220,420,222, 422	4
-838-	30 〃 〃 〃 R221,421,241, 441	4
-094-	10 〃 〃 〃 R228,428	2
-081-	220 〃 〃 〃 R236,436	2
-794-	5.1 〃 〃 〃 R237,437,238, 438,239,439, 240,440	8
1-203-058-	Carbon 3.3K ohms RD1/4L ±5% R215,235,415, 435	4
1-207-151-	Wire Wound 0.5 ohms 2P ±10% R223,423,224,424, 225,425,226,426	8
1-209-576-	Carbon 4K ohms RD2L ±5% R218,418	2
	Circuit Breaker Section	
1-223-010-	Adjustable, wire wound 200 ohms (B) R502	1
	Composition Resistor	
1-201-079-	47 ohms RC1/2 ±10% R501	1
-685-	1.2K 〃 〃 〃 R503,504	2
-086-	5.6K 〃 〃 〃 R505	1
-100-	100 〃 〃 〃 R506	1
1-207-157-	Wire Wound 1K ohm 2P ± 10% R507,508	2
-156-	Wire Wound 300 ohms 4P ±10% R510	1
	Muting Section	
1-221-427-	Adjustable 500 ohms (B) R519	1
	Wire Wound	
1-207-104-	30 ohms 6P(4W) ±10% R511,512	2
-153-	1.5K 〃 6P(4W) 〃 R514	1
-152-	110 〃 2P(1.5W) 〃 R514	1
-154-	680 〃 8P(5W) 〃 R523	1
-155-	2.5K 〃 6P(4W) 〃 R524	1
	Composition Resistor	
1-201-844-	75K ohms RC1/2 ±10% R515	1
-079-	47 〃 〃 〃 R516	1
-090-	6.8K 〃 〃 〃 R517	1
-096-	470 〃 〃 〃 R518	1
-459-	8.2K 〃 〃 〃 R520	1
-089-	4.7K 〃 〃 〃 R521,522	2

※ Noiseless Carbon Resistor

Part No.	Description	Q'ty
	Capacitors	
	General Items	
1-101-534-	Encapsulated Component 120 ohms +0.1μF 500WV	1
1-105-669-	Mylar 0.0047μF ±10% C151,251,253,155,255	6
1-105-675-	Mylar 0.015μF ±10% 50WV C152,252,158,258	4
-665-	Mylar 0.0022μF ±10% 50WV C154,254	2
-671-	Mylar 0.0068μF ±10% 50WV C156,256	2
-673-	Mylar 0.01μF ±10% 50WV C157,257	2
-689-	Mylar 0.22μF ±10% 50WV C150,250	2
-841-	Mylar 0.047μF ±20% 50WV C510	1
1-115-045-	Oil tublar 0.1μF 500WV ±20% C509	1
1-121-326-	Electrolytic 1μF 25WV ±20% C149,249	2
-323-	Electrolytic 4000μF 100WV C508	1
-327-	Electrolytic 2000μF 80WV C179,279	2
-328-	Electrolytic 2000μF 35WV C505	1
1-109-040-	Mica 150pF 1000TV ±10% C190,290	2
	Equalizer Amplifier Section	
1-131-029-	Tantalum 10μF 3WV ±20% C101,201,112,212	4
1-121-179-	Electrolytic 10μF 25WV C102,202,113,213,128,228	6
-145-	〃 1μF 6WV C104,204,115,215	4
-135-	〃 50μF 6WV C105,205,116,216	4
-192-	〃 10μF 15WV C107,207,111,211,117, 217,118,218,124,224	10
-104-	〃 10μF 6WV C122,222,123,223	4
-190-	〃 200μF 25WV C126,226	2
-111-	〃 100μF 3WV C127,227	2
1-109-002-	Mica 100pF 1KV ±10% C114,214,103,203	4
1-105-665-	Mylar 0.0022μF 50WV ±10% C106,206	2
-513-	〃 0.01μF 50WV ±5% C109,209	2
-667-	〃 0.0033μF 50WV ±10% C110,210	2
-517-	〃 0.022μF 50WV ±5% C120,220	2
1-113-137-	〃 0.04μF 50WV ±5% C108,208	2
-138-	〃 0.068μF 50WV ±5% C119,219	2
-136-	〃 0.033μF 50WV ±5% C121,221	2
1-105-661-	〃 0.001μF 50WV ±10% C183-185,283-285	6
	Line Amplifier Section	
1-121-179-	Electrolytic 10μF 25WV C129,229,131,231,138, 238,144,244,148,248	10
-192-	〃 10μF 15WV C130,230,137,237,143,243	6
-104-	〃 10μF 6WV C132,232,133,233,139, 239,140,240	8
-190-	〃 200μF 25WV C135,235,142,242	4
1-121-111-	Electrolytic 100μF 3WV C134,234,141,241	4
-324-	〃 1μF 25WV ±20% C145,245,146,246	4
-325-	〃 2μF 25WV ±20% C147,247	2
1-105-661-	Mylar 0.001μF 50WV ±10% C186-188,286-288	6
	Tone Control Capacitor Section	
1-113-142-	Mylar 0.068μF 50WV ±10% C159,259	2
-141-	〃 0.047μF 50WV ±10% C160,260	2
-140-	〃 0.033μF 50WV ±10% C161,261	2
-139-	〃 0.022μF 50WV ±10% C162,262	2
-143-	〃 0.1μF 50WV ±10% C163,263,167,267	4
-135-	〃 0.47μF 50WV ±10% C164,264	2
-134-	〃 0.33μF 50WV ±10% C165,265,168,268	4
-133-	〃 0.22μF 50WV ±10% C166,266	2
	Power Amplifier Section	
1-121-172-	Electrolytic 100μF 50WV C169,269	2
-179-	〃 10μF 25WV C170,270	2
-143-	〃 10μF 50WV C171,271,172,272	4
-140-	〃 350μF 10WV C173,273	2
-161-	〃 500μF 6WV C175,275	2
-163-	〃 50μF 50WV C176,276	2
-142-	〃 5μF 50WV C177,277	2
1-190-001-	Mica 50pF 1KV ±10% C174,274	2
-006-	〃 300pF 1KV ±10% C178,278	2
-002-	〃 100pF 1KV ±10% C181,281	2
1-105-679-	Mylar 0.033μF 50WV ±10% C180,280	2
-661-	〃 0.001μF 50WV ±10% C189,289	2
	Circuit Breaker Section	
1-121-126-	Electrolytic 10μF 100WV C501	1
1-109-002-	Mylar 100pF 1KV ±10% C502	1
	Muting Section	
1-121-190-	Electrolytic 200μF 25WV C504	1
-261-	〃 200μF 35WV C506	1